

WHAT IS CLAIMED IS:

1. A method for applying electrical energy to tissue comprising:
positioning an active electrode adjacent to or in contact with tissue in the
5 presence of electrically conductive fluid;

applying a sufficient high frequency voltage difference between the
electrode terminal and a return electrode to generate a plasma adjacent to the active
electrode; and

effecting ablation of at least a portion of the tissue.

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2. The method of claim 1 further comprising generating electric fields
adjacent the active electrode, the electric fields having sufficient energy to generate the
plasma.

3. The method of claim 1 further comprising vaporizing a portion of the
15 electrically conductive fluid adjacent to the active electrode.

4. The method of claim 1 wherein the effecting ablation step is carried out
by contacting the tissue with the plasma.

5. The method of claim 1 wherein the effecting ablation step is carried out
20 by generating the plasma at a location spaced from the tissue.

6. The method of claim 5 wherein the plasma is generated at a location
spaced a distance of about 0.05 to 5 mm from the tissue, the method further comprising the
25 step of accelerating ions from the plasma such that the ions contact the tissue.

7. The method of claim 1 further comprising positioning the return electrode within the electrically conductive fluid such that electrically conductive fluid forms a current flow path between the active and return electrodes.

5 8. The method of claim 1 further comprising directing the electrically conductive fluid along a fluid path in contact with the active and return electrodes.

9. The method of claim 1 further comprising applying a sufficient high frequency voltage difference between the active and return electrodes to generate energy of at least 3.5 eV within or around the plasma.

10. The method of claim 1 further comprising applying a sufficient high frequency voltage difference between the active and return electrodes to generate energy of at least 4.0 eV within or around the plasma.

11. A system for applying electrical energy to tissue at a target site comprising:

an electrosurgical instrument having a shaft with a proximal end, a distal end and one or more electrode terminals at the distal end of the shaft;

a return electrode;

one or more connectors coupled to the electrode terminals for connecting the electrode terminals to a high frequency power supply; and

an insulating shield coupled to the distal end of the shaft, the shield having a distal surface spaced distally from the electrode terminals, such that when the distal surface of the shield is adjacent to, or in contact with, tissue at a target site, the shield forms a chamber between the electrode terminals and the tissue.

12. The system of claim 11 wherein the return electrode is positioned on the instrument and spaced proximally from the electrode terminals.

5 13. The system of claim 11 wherein the return electrode is positioned within the chamber and spaced from the electrode terminals.

14. The system of claim 11 comprising a single active electrode terminal.

10 15. The system of claim 11 comprising a plurality of electrically independent electrode terminals.

15 16. The system of claim 11 comprising a plurality of non electrically independent electrode terminals.

17. The system of claim 11 wherein the electrode terminals and the return electrode are configured, upon the application of a sufficient high frequency voltage in the presence of electrically conductive fluid, to generate a plasma within the chamber.

20 18. The system of claim 17 wherein the plasma is generated at a location spaced a distance of about 0.05 to 5 mm from the tissue, wherein the electrode terminals and the return electrode are configured, upon the application of a sufficient high frequency voltage in the presence of electrically conductive fluid, to accelerate ions from the plasma

in the chamber such that the ions contact the tissue, the ions having sufficient energy to ablate the contacted tissue.

5 19. The system of claim 11 further comprising a fluid delivery element having a distal opening coupled to the chamber for delivering electrically conductive fluid into the chamber around the electrode terminals.

20. The system of claim 11 further comprising an aspiration lumen having distal opening coupled to the chamber for aspirating fluid from the chamber.

10 21. A method for applying electrical energy to tissue comprising:
positioning an active electrode adjacent to or in contact with tissue in the presence of electrically conductive fluid;

15 applying a sufficient high frequency voltage difference between the electrode terminal and a return electrode to vaporize a portion of the electrically conductive fluid such that the vaporized fluid has a temperature below 100°C; and
effecting ablation of at least a portion of the tissue in contact with the vaporized fluid.

20 22. The method of claim 21 wherein the electrically conductive fluid is vaporized at a subatmospheric pressure.

23. The method of claim 21 wherein said electrically conductive fluid has a boiling temperature below 100°C at 1 atmosphere pressure.

24. The method of claim 21 further comprising applying a sufficient high frequency voltage difference between the active and return electrodes to generate energy of at least 3.5 eV within or around the vaporized fluid.

5 25. The method of claim 21 further comprising applying a sufficient high frequency voltage difference between the active and return electrodes to generate energy of at least 4.0 eV within or around the vaporized fluid.

10 26. The method of claim 21 further comprising applying a sufficient high frequency voltage difference between the electrode terminal and a return electrode to vaporize a portion of the electrically conductive fluid such that the vaporized fluid has a temperature below about 80° C.

15 27. A method for applying electrical energy to tissue comprising:
positioning an active electrode adjacent to or in contact with tissue in the presence of an electrically conductive fluid comprising at least about 1.0% sodium chloride;
applying a sufficient high frequency voltage difference between the electrode terminal and a return electrode to vaporize a portion of the electrically conductive fluid; and
20 effecting ablation of at least a portion of the tissue in contact with the vaporized fluid.

25 28. The method of claim 27 wherein the electrically conductive fluid comprises at least about 2% sodium chloride.

29. The method of claim 27 wherein the electrically conductive fluid comprises at least about 5% sodium chloride.

5 30. A method for applying electrical energy to tissue comprising:
positioning an active electrode adjacent to or in contact with tissue in the presence of an electrically conductive fluid comprising between about 0.1% to 0.85% sodium chloride;

10 applying a sufficient high frequency voltage difference between the electrode terminal and a return electrode to vaporize a portion of the electrically conductive fluid; and

effecting ablation of at least a portion of the tissue in contact with the vaporized fluid.

15 31. A method for applying electrical energy to tissue comprising:
positioning an active electrode near tissue in the presence of electrically conductive fluid;

applying a sufficient high frequency voltage difference between the electrode terminal and a return electrode to generate a plasma adjacent to the active electrode; and

20 effecting ablation of at least a portion of the tissue, while maintaining the active electrode at least 1.0 mm away from the tissue.

25 32. The method of claim 31 further comprising effecting ablation of at least a portion of the tissue, while maintaining the active electrode at least 2.0 mm away from the tissue.